REMARKS

Claims 1-17 are pending with claims 16 - 17 added by this paper and claims 4 - 6 being withdrawn.

Claim Amendments

Claim 4 has been amended to correct grammar and claims 14 and 15 have been amended to add articles before "synthetic quartz glass". These amendments do not narrow the scope of the claims.

Claim Rejections Under 35 U.S.C §103

Claims 1 - 2, 7 - 11 and 14 - 15 stand rejected under 35 U.S.C §103(a) as allegedly being unpatentable over U.S. Patent No. 6,319,634 (Berkey) in view of Examiner's official notice as evidence by U.S. Patent No. 5,778,730 (Rupert). Additionally, Applicants' representative James E. Ruland appreciates Examiner Lopez's time and courtesy during the telephone conference of 8 July 2004. The sole applicable item discussed during that teleconference was clarifying that U.S. Patent No. 4,650,511 (Koya) is also being cited as official notice. Applicants respectfully traverse these rejections.

With respect to Berkey, Berkey fails to teach or suggest a quartz silica matrix having a density of 0.1 - 1.0 gm/cm^2 with its distribution within 0.1 gm/cm^2. Consequently, failing to teach or suggest all the features of the claimed invention, Berkey cannot render the claimed invention obvious.

Moreover, the method disclosed in Berkey is an OVD method. See, e.g., the description of an OVD process and a VAD process at column 3, lines 30 - 38 of Rupert. As such, the OVD method in Berkey would impart a glass tube having a lower density at the

outer surface than at the center portion. This density difference can create non-uniformity in the deposition of a material, e.g., fluorine, which in turn can invite a distribution of transmittance. See, e.g., the present specification at page 7, lines 22 - 34.

Additionally, the present invention provides a matrix having a uniform density by controlling the angle of a burner (i.e., the silica matrix and the flame of reactant gas from the burner oriented to define an angle of 90° - 110° between their respective center axes). In marked contrast, Rupert introduces a barrier gas stream to stabilize the length and position of a reaction zone to control deposition of the soot. So, Applicants respectfully submit that one of skill in the art would not be lead to the teachings of Rupert because its solution pertains to introducing a barrier gas stream. See columns 2 - 3 of Rupert.

With respect to the alleged official notice provided by Rupert, Applicants respectfully traverse. Particularly, the action alleges that Rupert provides notice (relevant to Berkey) that the density of the silica matrix is desired to be constant, has zero density distribution, and that the density of the silica matrix would depend on the desired purpose. However, the action's allegations are not consistent with the entire paragraph cited in Rupert, namely:

> The inventors conducted extensive experiments with the goal of producing soot bodies with specific types of radial density profiles; <u>normally</u>, it is desired to produce a density profile in which density remains constant across the wall thickness of the soot body. The first attempt consisted in trying to compensate for the increase in the cooling rate of the soot body as it grows larger by moving the burner or burners closer to the surface of the soot body. As a result, the length of the reaction zone was reduced; the complete oxidation of the gaseous glass starting material was prevented; and both the degree of conversion and the deposition rate were thus reduced.

See column 2, lines 37 - 48, emphasis added. Particularly, the passage cited by the action is qualified with the term "normally". It is not in all situations that it is desired to produce a density profile in which the density remains constant across the wall thickness of the soot body. Rather, this is <u>normally</u> desired. Moreover, Rupert pertains to making soot

bodies for the production of optical fibers. See column 1, lines 51 - 63. The Office has failed to provide official notice that such a desire would be applicable for all applications of soot bodies, such as the optical photolithography mask blanks as disclosed by Berkey. Therefore, Applicants traverse any alleged official notice provided by Rupert.

Also, a constant silica matrix density, and zero density distribution is an ideal in some soot bodies. Rupert fails to provide any notice of how one of ordinary skill in the art would accomplish such an end result in the process disclosed by Berkey.

Also, Applicants respectfully traverse the assertion that Koya provides official notice that a silica matrix intended for transmitting light, which is produced by the flame hydrolysis method, has an average density of 0.1 to about 0.5 gm/cm^2 (see column 4, line 12 of Koya). First, Koya does not state that all silica matrixes for transmitting light have an average density of 0.1 to about 0.5 gm/cm^2. Also, it is not clear that the bulk density disclosed by Koya for a porous silica body made for an optical fiber (see, e.g., column 1) would be applicable to all porous silica bodies. Particularly, there is no teaching or suggestion within Berkey that such a density is inevitable or even desired. Consequently, Applicants respectfully traverse the assertion that the alleged official notice provided by Koya is applicable to all silica bodies made for whatever purpose, and particularly to the optical photolithography mask blank of Berkey.

Claims 1, 7 - 8, 10 - 11 and 14 - 15 stand rejected as allegedly being unpatentable over Koya, in view of official notice provided by Rupert, U.S. Patent No. 5,203,898 (Carpenter), and Berkey. Applicants respectfully traverse these rejections.

At the outset, Koya fails to teach or suggest orientating a porous silica matrix and the flame of a reactant gas from a burner to define an angle of 90° - 110° between their respective

center axes. Failing to teach or suggest this feature, Applicants respectfully submit that Koya cannot render the claimed invention *prima facie* obvious.

With respect to the alleged official notice provided by Rupert of constant density and Berkey of the burner angle, Applicants respectfully submit that these references have been discussed above. Particularly, Rupert does not state that a constant density is desired in all instances, as discussed above. With respect to Berkey, Applicants respectfully submit that Berkey would not yield a constant density because it pertains to an OVD method versus a VAD method. Moreover, the angle of the burner and matrix in Berkey for making an optical photolithography mask blank would not provide official notice for making glass substrates of all types, including those used in optical fibers, as disclosed by Koya. Consequently, Applicants respectfully traverse the alleged official notice.

With respect to U.S. Patent No. 5,203,898 (Carpenter), Applicants respectfully submit that Carpenter pertains to a process for making a fiber optic coupler, which includes making a boron oxide doped tubular porous preform. Applicants respectfully submit that no official notice is provided in the Action or references supporting an assertion that the angle disclosed for making a boron oxide doped fiber optic coupler would be applicable for making an optical fiber (relevant to Koya) or an optical photolithography mask blank (relevant to Berkey). Consequently, Applicants respectfully traverse the alleged official notice.

Thus, Applicants respectfully submit that failing to teach or suggest all the features of the claimed invention, Koya cannot render the claimed invention *prima facie* obvious.

Supererogatorily, the present invention provides significant and unexpected results. Particularly, Applicants have discovered that if a matrix having a uniform density is obtained by controlling the angle of the burner, the matrix can vitrify into a quartz glass having a uniform fluorine concentration. Thus, a synthetic quartz glass having uniform distributions

of transmittance and refractive index can be obtained. These significant and unexpected results are demonstrated in the examples and comparative example at pages 11 - 14 of the present specification. Particularly, comparative example 1 produces a cylindrical form by feeding the gases under the same conditions as in example 1 and carrying out hydrolysis in an oxyhydrogen flame. The angle between the center axis of the matrix and the center axis of the reactive flame ejected from the burner is 130°. As depicted in Table 1 at page 14, example 1 had a refractive index distribution of 5×10^{-4} as compared to a refractive index distribution of 1×10^{-3} for comparative example 1. Additionally, example 1 has a transmittance percent of 83.2 - 84% versus comparative example 1 having a transmittance percent of 75.0 - 80.5%. These results are significant and unexpected.

With respect to the teachings of the other secondary reference, namely U.S. Patent No. 6,653,024 B1 (Shiraishi), because it does not cure the basic deficiencies of the primary references, its combination with the other prior art would not supply the missing teachings to render the claims obvious. So as not to burden the record further, Applicants will not discuss this reference in detail except to state that Applicants do not necessarily acquiesce to any of the statements in the Office Action referring to such secondary reference and reserve the right to comment later regarding the same, if ever necessary.

In view of the above, favorable reconsideration is courteously requested. If there are any remaining issues which can be expedited by a telephone conference, the examiner is courteously invited to telephone counsel at the number indicated below.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,

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